



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604

DATE: NOV 11 2014

SUBJECT: CLEAN AIR ACT INSPECTION REPORT
DP&L Killen Station- Manchester, Ohio

FROM: Patrick Miller, Environmental Engineer 
AECAB (MN/OH)

THRU: Brian Dickens, Section Chief 
AECAB (MN/OH)

TO: File

ATTACHMENTS: Original Method 9 Visual Emissions Observation Form (Dated 9/30/2014)

Facility: The Dayton Power and Light Company (DP&L) Killen Station

Location: 14869 U.S. 52 Manchester, Ohio 45144

Date of Inspection: October 1, 2014

EPA Inspectors:

Ethan Chatfield, EPA, Environmental Engineer

Patrick Miller, EPA, Environmental Engineer

Facility Attendees:

Jim Stice, Environmental, Health, and Safety Coordinator, DP&L Killen Station

Steven Barnoski, Assistant Plant Manager, DP&L Killen and Stuart Station

Douglas Keith, Operations Manager, DP&L Killen Station

JoAnne Rau, Environment and Safety Management Director, DP&L

Off-site Observation of Plant:

On September 30, 2014, Mr. Chatfield and Mr. Miller of the EPA observed a secondary plume and visible emissions from the stack at the DP&L Killen Station (Killen). Method 9 visible emissions readings were performed by Mr. Miller for 36 minutes from 4:15 PM-4:51 PM. EPA inspectors agreed to perform an inspection to determine the root cause of the visible emissions and better understand current operations of the facility on October 1, 2014.

Purpose of the Inspection:

The purpose of the inspection was to determine the root cause of the visible emissions of the secondary plume observed on September 30, 2014 and Killen's compliance with the Clean Air Act (CAA).

Arrival and Opening Conference:

Mr. Chatfield and Mr. Miller of the EPA arrived at the facility at 8:35 AM. EPA presented credentials and asked to talk to the environmental manager at the security guard station. Security informed EPA that Jim Stice, the Environmental, Health, and Safety Coordinator at Killen, would escort EPA into the facility. EPA was given visitor badges and was finally met by Douglas Keith at 9:20 AM. Mr. Keith led EPA into a conference room in the main office and Mike Tumey conducted a safety orientation that started at 9:25 AM. The safety orientation ended at 9:35 AM and Mr. Stice entered the conference room. EPA informed Mr. Stice that this was an unannounced inspection pursuant to the CAA.

Mr. Stice asked what triggered the inspection. EPA informed Mr. Stice that a secondary plume and visible emissions were seen on September 30, 2014 (Figure 1) and as EPA inspectors were driving up to the facility. Mr. Stice proceeded to review a list of questions he was required to ask when such an inspection takes place. EPA explained that it noticed a trend of increasing nitrogen oxide (NO_x) and sulfur dioxide (SO₂) emissions in the Clean Air Markets reported data and was concerned. Mr. Stice indicated that the assistant plant manager would be joining the meeting and that JoAnne Rau from the corporate office in Dayton, Ohio was driving down to join as well. EPA then asked Mr. Stice for an overview of the facility and then a tour of the facility, specifically looking at the pollution control equipment. Steven Barnoski, assistant plant manager, joined the meeting at 9:57 AM after driving from the DP&L Stuart Station nearby.



**Figure 1 Secondary plume from Killen Station stack
(Viewed from south side of Ohio River in Kentucky)**

Overview of Company:

The DP&L Killen Station was built in 1982 and is capable of generating 650 MW. There are a total of about 123 employees both salaried and hourly. DP&L is a subsidiary of AES Company, which is headquartered in Arlington, Virginia.

Process Discussion:

Mr. Stice indicated that there was a general overview presentation regarding operations of Killen that would facilitate the discussion. While the presentation was being loaded, EPA asked Mr. Barnoski if he

could explain the increasing NO_x and SO₂ emissions. He indicated it was due to switching from “compliance” coal to Illinois Basin coal which has a higher sulfur content but is \$10-\$20 cheaper to purchase. Illinois Basin coal has a sulfur content ranging from 2.5%-6.5% and Killen specifies a 4.5% sulfur content target.

Mr. Stice began going through the presentation on operations focusing on the pollution control equipment, specifically the electrostatic precipitator (ESP), the selective catalytic reduction (SCR), and the flue gas desulfurization scrubber (FGD) (Figure 2). The boiler is fired on #2 fuel oil at start up because the ESP needs to get up to temperature in order to operate efficiently. After the temperature reaches 200°F, the boiler is switched over to coal. Coal is not fired in the boiler until the ESP is up to temperature and operating. There are additional safety concerns if the boiler was fired on coal during start up. The ESP is on the hot side of the air exchanger (pre-heater).

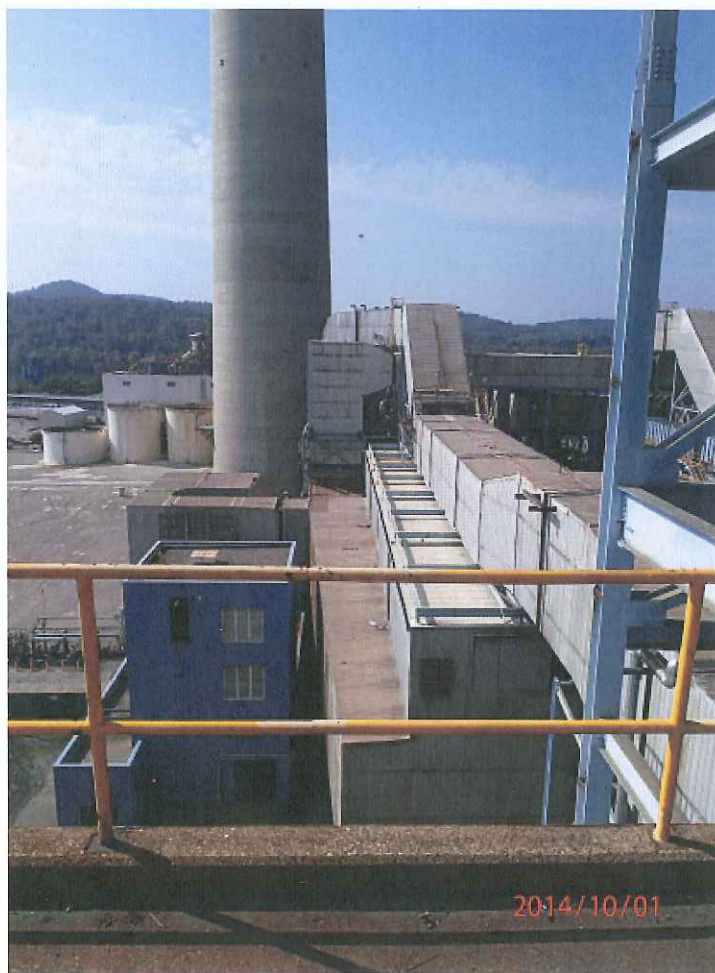


Figure 2 East ductwork (ESP housing and SCR shown)

The SCR was installed in 2004 purely for the NO_x credits under NO_x SIP call. The SCR is a horizontal flow type SCR (Figure 3). Upon exiting the boiler, the ductwork splits into two different paths, East and West, before combining again prior to the FGD. The SCR uses ammonia injection and cycled 6 months in service and 6 months out of service. The system is equipped with a bypass and is used when the system is out of service. It costs more to operate the SCR in ammonia usage than is earned in credits on the Clear Air Markets. There is a minimum temperature for operation of the SCR such that the SCR is bypassed during startup to prevent potential ammonia slip. Ammonia injection is monitored by computers to

protect catalyst life and prevent ammonia slip from occurring. The catalyst layers are carefully monitored to ensure maximum catalyst life and reduce costs.



Figure 3 SCR Unit East (middle structure with rust coloring) and CEMS building (white building near base of stack)

The FGD (Figure 4) was installed for SO₂ credits in 2007 at a cost of around \$860 million and has been used since the switch from “compliance” coal to Illinois Basin coal. The FGD is a Chiyoda manufactured jet bubble reactor that holds 1.3 million gallons of limestone slurry. There is a small restriction bypass that allows up to 30% of the exhaust stream to bypass the FGD and exit through the stack. From 2008 to present day, the FGD is getting about 93% SO₂ removal. Killen is required to run the FGD at all times since the plant is now burning a high sulfur, Illinois basin coal and must show compliance with the Unit’s 1.2 lbs/MMBtu SO₂ NSPS limit.

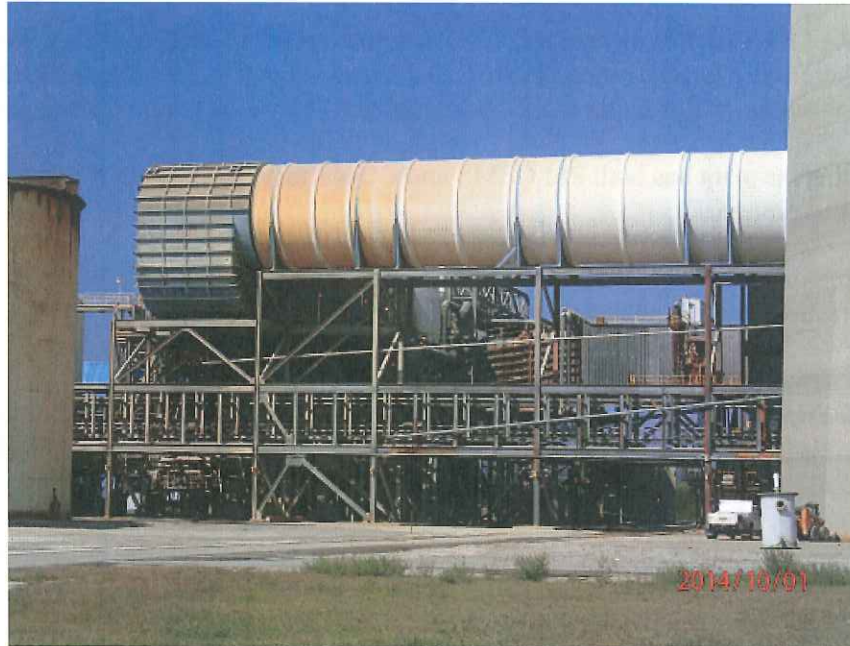


Figure 4 FGD Unit (outlet duct seen in foreground)

Mr. Stice indicated that a SBS system was recently installed at both the Killen (Figure 5) and Stuart stations to control sulfuric trioxide (SO_3) emissions that were corroding the ductwork downstream of the SCR. Mr. Stice indicated that the SBS systems were installed for operational reasons, not environmental and are very costly to operate. Neither of the SBS systems are currently running however due to “operational issues”. The SBS system at Killen uses soda ash injection at two locations, at the economizer and at the inlet of the secondary air. DP&L had problems with the injections lances at Killen and was forced to remove the lances and ship them to Texas for refurbishment. The lances are projected to be back from Texas and in service date by December 2014. The SBS system at Stuart was determined to be “unmanageable” and has no projected in service date. Mr. Stice was unaware of any permits obtained for the SBS system installations.



Figure 5 Location of SBS system (not currently in place)

Mr. Chatfield asked if Killen had any recent boiler or turbine planned outages (POs). Mr. Keith responded that there was a turbine outage in 2012 that lasted about 8 to 9 weeks, but he believes it was just for the turbine and no major boiler work was completed (only minor tube replacements).

Mr. Stice noted that the plant has both PM CEMS and COMS installed, though it's a wet plume and the COMS are installed post-FGD.

JoAnne Rau joined the inspection at 11:10 AM. EPA gave Ms. Rau a summary of the discussion up until her arrival. The facility walk-through began at 11:20 AM.

Facility Walk-Through

The facility walk-through was first conducted by Mr. Keith and entailed seeing the burner deck and area where the SBS system will be installed. Mr. Keith indicated that the SCR has been out of service since the end of July.

After the walk-through with Mr. Keith, Mr. Stice and Ms. Rau led a tour to see the continuous emissions monitoring system (CEMS) building (Figure 3) and FGD. The Killen has CEMS for SO₂, NO_x, PM and CO₂. The CEMS probes are located at 450 feet up the stack, which has a total height of 900 feet. During the inspection the CEMS were reading 0.449 lbs SO₂ per MMBtu (on a 3-hour average) and 0.540 lbs NO_x per MMBtu (on a 3-hour average). Ms. Rau indicated that in order to be in compliance with the Mercury and Air Toxics Standards (MATS) in April 2015, the SCR will need to run constantly. There is no planned additional construction to meet the MATS.

Closing Conference:

The walk-through ended at 12:20 PM. EPA took (20) photos during the facility tour and digital copies were left with Mr. Stice on his laptop computer. EPA indicated that the initial next step is that an inspection report would be written. EPA explained that the inspection would not contain a determination of compliance and that if EPA needed more information it would send a Section 114 of the CAA Information Request.

The inspection ended at 12:30 pm.

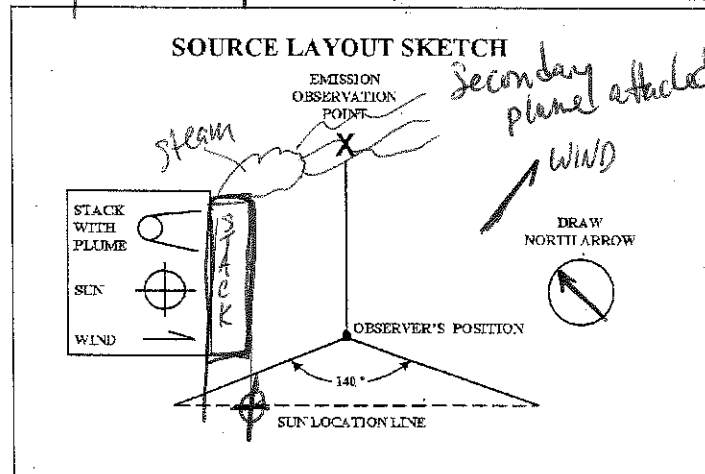
Standard bcc's: Official file copy w/attachment(s)

Other bcc's:

Creation Date:	November 4, 2014
Filename:	C:\Users\pmille02\Documents\EPAWork\Projects\DP&L Killen Station\DP&L Killen Station Inspection Report 10 01 2014.docx
Legend:	ARD:AECAB:AECAS(MN/OH): P. Miller

VISIBLE EMISSION OBSERVATION FORM

Company Name DEER KILLER STATION			
Location 14869 US Hwy 52			
City MANCHESTER	State CH	Zip 45144	
Process Equipment 1 Coal Fired Boiler		Operating Mode OPERATING	
Control Equipment SO₂ Control (SAS system)		Operating Mode Not operating	
Describe Emission Point SECONDARY plume after steam plume from single stack.			
Height of Emission Point 900 ft.		Height Relative to Observer Start 894 ft End 894 ft.	
Distance to Emission Point Start 2500 ft End 2500 ft		Direction to Emission Point Start NE End NE	
Vertical Angle to Observation Pt. Start End		Direction to Observation Point Start End	
Describe Emissions Start lacy / Pluffy End lacy / Pluffy			
Emission Color Start BROWNISH End (same)		If Water Droplet Plume (Circle) <input checked="" type="checkbox"/> Attached <input type="checkbox"/> Detached <input type="checkbox"/> N/A	
Point In The Plume At Which Opacity Was Determined Start AFTER STEAM PLUME End (same)			
Describe Plume Background Start PARTLY cloudy End Partly cloudy			
Background Color Start gray / dark clouds End (same)		Sky Condition Start Scattered End Scattered	
Wind Speed Start LIGHT End LIGHT		Wind Direction Start SW End SW	
Ambient Temp Start 78°F End 78°F		Wet Bulb Temp RH Percent	



Observation Date 9/30/14		Start Time 4:15 pm		End Time 4:51 pm	
Min	Sec				Comments
	0	15	30	45	
1	15	25	15	20	
2	20	20	20	20	
3	20	30	30	25	
4	25	25	50	45	
5	40	30	25	25	
6	20	15	15	15	
7	10	15	15	15	
8	15	15	15	20	
9	15	15	10	15	
10	10	10	10	15	
11	15	10	10	5	
12	5	5	5	10	
13	10	10	10	10	
14	20	20	20	25	
15	20	25	20	20	
16	20	25	30	30	
17	20	20	20	15	
18	20	15	20	15	
19	20	20	20	15	
20	15	10	15	20	
21	25	20	20	20	
22	10	10	10	10	
23	10	15	10	5	
24	10	10	5	10	
25	20	15	25	25	
26	30	30	30	35	
27	40	35	35	40	
28	30	30	40	40	
29	35	35	35	40	
30	45	55	50	55	

Observer's Name (Print) PATRICK MILLER	
Observer's Signature <i>Patrick Miller</i>	Date 9/30/14
Organization US EPA REGION 5 AECAB	
Certified by Illinois EPA	Date 9/15/14

Additional Information

Continue on reverse side

Min \ Sec	0	15	30	45	Comments
31	30	35	25	25	
32	20	20	20	15	
33	15	15	15	15	
34	15	10	10	10	
35	15	15	20	15	
36	10	15	10	10	
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
51					
52					
53					
54					
55					
56					
57					
58					
59					
60					

Additional Information
